

I claim:

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- 1 1. A method for monitoring an operation in a well, comprising:
- 2 injecting a material into the well;
- 3 monitoring a characteristic in the well;
- 4 determining the placement position of the material in the well from the monitored
- 5 characteristic.

- 1 2. The method of claim 1, wherein the material is selected from a gravel slurry, a proppant,
- 2 a fracturing fluid, a chemical treatment, a cement, and a well fluid.

- 1 3. The method of claim 1, wherein the measuring step is performed using a sensor
- 2 positioned in the well.

1 4. The method of claim 3, wherein the sensor is positioned internal to a well casing in the
2 well.

1 5. The method of claim 3, wherein the sensor is positioned internal to a sand screen placed
2 in the well.

1 6. The method of claim 3, wherein the sensor measures one or more of temperature,
2 pressure, flow, stress, strain, compaction, sand detection, and seismic measurements.

1 7. The method of claim 3, wherein the sensor is a fiber optic line.

1 8. The method of claim 7, wherein the fiber optic line provides a distributed temperature
2 measurement, a distributed pressure measurement, a distributed stress measurement, a
3 strain temperature measurement, a distributed sand detection measurement, and a
4 distributed seismic measurement.

1 9. The method of claim 7, wherein at least a portion of the fiber optic line is routed along a
2 nonlinear path.

1 10. The method of claim 7, wherein at least a portion of the fiber optic line is routed along a
2 helical path.

1 11. The method of claim 7, further comprising increasing the resolution of the measurement
2 provided by the fiber optic line by routing at least a portion of the fiber optic along a
3 nonlinear path.

1 12. The method of claim 7, further comprising increasing the resolution of the measurement
2 provided by the fiber optic line by routing at least a portion of the fiber optic along a path
3 that provides a length of fiber optic line in the portion that is greater than the longitudinal
4 length of the well in the corresponding portion of the well.

1 13. The method of claim 1, wherein the monitored characteristic is selected from

2 temperature, pressure, flow, stress, strain, sand detection, and seismic measurements.

1 14. The method of claim 1, further comprising performing a remedial action based upon the
2 determined placement.

1 15. The method of claim 14, wherein the remedial action comprises one or more of isolating
2 a portion of the well and injecting additional material into the well.

1 16. The method of claim 1, wherein the well is a multilateral well having at least two
2 branches.

1 17. The method of claim 16, wherein at least one of the branches has a gravel pack
2 completion therein.

- 1 18. The method of claim 16, further comprising a fiber optic line placed in the gravel pack
2 completion.
- 1 19. The method of claim 1, further comprising expanding an expandable tubing in the well.
- 1 20. The method of claim 19, further comprising monitoring a characteristic of the expandable
2 tubing during expansion.
- 1 21. The method of claim 20, further comprising determining the extent of the expansion.
- 1 22. The method of claim 19, further comprising reexpanding a portion of the expandable
2 tubing.
- 1 23. The method of claim 1, further comprising:

2 injecting the material into the well using a service tool, the service tool having a sensor
3 therein; and
4 monitoring a characteristic of the material with the sensor.

1 24. The method of claim 23, further comprising comparing the monitored characteristic from
2 the sensor in the service tool to the monitored characteristic in the well.

1 25. The method of claim 1, further comprising heating the material prior to the injection step.

1 26. The method of claim 1, further comprising cooling the material prior to the injection step.

1 27. The method of claim 1, wherein the material is substantially at surface ambient
2 temperature prior to the injection step.

1 28. The method of claim 1, wherein the operation is a strip rate test.

1 29. A system used to monitor an operation in a well, comprising:

2 a pump in communication with the well and with a source of material at the surface;

3 an intelligent completions device positioned in the well proximal a desired fluid

4 placement position; and

5 a surface controller in communication with the intelligent completions device adapted to

6 receive data from the intelligent completions device and provide an indication of

7 the placement position of the material.

1 30. The system of claim 29, wherein the intelligent completions device is a sensor.

1 31. The system of claim 29, wherein the intelligent completions device is a fiber optic line.

1 32. A system used to monitor an operation in a well, comprising:
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3 means for injecting a material into the well;
4
5 means for monitoring a characteristic in the well;
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7 means for determining the placement position of the material in the well from the monitored
8 characteristic.

1 33. A service tool for use in a well, comprising an intelligent completions device in the
2 service tool.

1 34. The service tool of claim 33, wherein the intelligent completions device is a sensor.

1 35. The service tool of claim 33, wherein the intelligent completions device is a fiber optic
2 line.

1 36. The service tool of claim 33, further comprising:

2 an outlet; and

3 the intelligent completions device positioned proximal the outlet.

1 37. A method for monitoring a well operation, comprising:

2 running a service tool into the well;

3 delivering a material through the service tool; and

4 monitoring a characteristic of the material with the service tool.

1 38. The method of claim 37, wherein the monitoring step is performed using one or more of a

2 sensor and a fiber optic line in the service tool.

1 39. The method of claim 37, further comprising monitoring the material exiting the service

2 tool.

1 40. The method of claim 37, further comprising:

2 measuring a well characteristic using one or more of a sensor and a fiber optic line that is

3 separate from the service tool; and

4 comparing the characteristic measured by the service tool to the well characteristic.

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